THAT WHICH IS CLAIMED IS:

1. A method of treating a dielectric surface portion of a semiconductor substrate, comprising the steps of:

(a) providing a semiconductor substrate having a dielectric surface portion; and then

(b) treating said dielectric surface portion with a reagent of the formula A_m-X_n-B_o, wherein:

A is a reactive group,

m is an integer of from 1 to 3,

X is a linking group,

n is an integer of from 0 to 20,

B is a coordinating group having a metal bound thereto; and

o is an integer of from 1 to 3,

so that said metal is deposited on said dielectric surface portion to produce a surface portion treated with a metal.

2. The method of claim 1, wherein treating step is carried out by contacting said surface portion to a solvent carrying said reagent.

3. The method of claim 2, wherein said solvent comprises liquid carbon dioxide.

4. The method of claim 2, wherein said solvent comprises supercritical carbon dioxide.

5. The method ofr claim 1, wherein said dielectric surface portion comprises an etch-exposed surface portion.

6. The method of claim 1, wherein said dielectric surface portion comprises a porous low k dielectric material.

7. The method of claim 1, wherein said metal selected from the group consisting of Pt, Pd, Rh, Ni, Ru, Co, Au, Zr, Mo, Ag, Cr, W, Ta, Hf, V, and Zn..

8. The method of claim 1, wherein said linking group is an organic or silicon linking group.

9. The method of claim 1, wherein said reactive group is selected from the goup consisting of silanes, silanols, halosilanes, acetoxysilanes, enoxysilanes, oximosilanes, alkoxysilanes, aminosilanes, epoxides, and isocyanates.

10. The method of claim 1, wherein said treating step is carried out by:

(i) treating said dielectric surface portion with a reagent of the formula A_m-X_n-B_o, wherein:

A is a reactive group,

m is an integer of from 1 to 3,

X is a linking group,

n is an integer of from 0 to 20,

B is a coordinating group; and

o is an integer of from 1 to 3; and then

(ii) binding a metal to said coordinating group so that said metal is bound to said dielectric surface portion.

11. The method of claim 1, wherein said treating step is carried out by:

(i) providing a reagent of the formula A_m-X_n-B_o, wherein:

A is a reactive group,

m is an integer of from 1 to 3,

X is a linking group,

n is an integer of from 0 to 20,

B is a coordinating group having a metal bound thereto; and

o is an integer of from 1 to 3; and then

(ii) treating said dielectric surface portion with said coating reagent so that said metal is bound to said surface portion.

12. The method of claim 1, further comprising the step of:

(c) depositing a barrier material on said treated surface portion to form a barrier layer thereon.

13. The method of claim 12, wherein said barrier material comprises a metal, ceramic, or metal alloy.

14. The method of claim 12, wherein said depositing step is carried out exposing said surface portion to a metal chelate in the presence of a reducing reagent.

15. The method of claim 12, wherein said barrier material is selected from the group consisting of tantalum, tantalum nitride, titanium nitride, tungsten, tungsten nitride, cobalt, cobalt nitride, cobalt phosphide, cobalt boride, cobalt tungsten phosphide, cobalt tugnsten boride, ruthenium, ruthenium nitride, ruthenium phosphide, and ruthenium boride.

16. The method of claim 12, wherein said barrier material does not penetrate through said surface portion into said semiconductor substrate during said depositing step.

17. The method of claim 12, further comprising the step of:
(d) depositing a metal on said barrier layer to form a metal seed layer.

18. The method of claim 17, wherein said metal is copper.

19. The method of claim 12, further comprising the step of filling a patterned feature containing said barrier layer with a metal.

20. The method of claim 19, wherein said metal is copper.

21. A semiconductor substrate produced by the process of claim 1.

22. The substrate of claim 21, wherein treating step is carried out by contacting said surface portion to a solvent carrying said reagent, and wherein said solvent comprises liquid or supercritical carbon dioxide.

23. A semiconductor substrate produced by the process of claim 12.

24. The substrate of claim 23, wherein treating step is carried out by contacting said surface portion to a solvent carrying said reagent, and wherein said solvent comprises liquid or supercritical carbon dioxide.

25. A semiconductor substrate produced by the process of claim 17.

26. The substrate of claim 25, wherein treating step is carried out by contacting said surface portion to a solvent carrying said reagent, and wherein said solvent comprises liquid or supercritical carbon dioxide.

27. A semiconductor substrate, comprising:

(a) a semiconductor substrate having a dielectric surface portion; and

(b) a coating on said dielectric surface portion, said coating comprising a coating reagent of the formula A_m-X_n-B_o, wherein:

A is a reactive group coupled to said surface portion,

m is an integer of from 1 to 3,

X is a linking group,

n is an integer of from 0 to 20,

B is a coordinating group having a metal bound thereto; and

o is an integer of from 1 to 3.

28. The substrate of claim 27, further comprising:

(c) a barrier coating on said metal coating.

29. The substrate of claim 28, further comprising:

(d) a metal layer on said barrier coating.